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מערכת שליטה ובקרה של צי רכב

Control system for vehicle fleets

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2

CONTROL SYSTEM FOR VEHICLE FLEETS

This invention relates to a control system for vehicle fleets, capable to provide an automatic authorization and identification of a specific driver for a specific vehicle; control the driver's schedule; and authorize fueling and register the fuel consumption.

Background of the invention.

An automatic computerized system "Autofuel"R is widely known in the market, and is designed for the automatic fueling of an authorized vehicle at fuel stations, and simultaneous registration of the fuel consumption, and further charging of the authorized vehicle's owner.

The "Autofuel"R system comprises a detector, wherein a transmitter is mounted on a vehicle, and a receiver is positioned on the fuel supply hose in the station. The detector is intended to recognize vehicles of a specific company, which is authorized to be serviced at that fuel station. A fuel gauge, delivering the fuel to the vehicle, is then connected to the central computer, collecting data concerning the fuel consumption by the recognized vehicles. A data base may optionally be supplied with the

information concerning the driver of the car, the milage. The milage is derived from the vehicles tachometer and transmitted simultaneously to the recognition data transferred to the receiver end at the fuel station.

Another known system being an automatic system allowing an authorized driver to start a car. This system comprises a key-media, more particularly a smart-card, bearing a specific code; the second corresponding part of the system is an identification device, mounted in the car. The user, intending to start the car, should firstly insert the smart-card into the identification device; and only if the card is recognized by the device, the user can start the car.

A further known system is a computerized control system installed in vehicles to register working parameters of the vehicle, such as speed, motor's RPM, breaking power, shock, etc. Such systems are known as "black box" and are commonly used for control of the vehicle's function especially used in trucks or buses.

These known systems, however, are unable to provide full control of the driver's activity during his working day. Such a tight control having several

needed limitations as would be necessary for the army, wherein control must be excercised on authorized use of vehicles, authorized drivers, and authorized fuel allocations. Such control may have to be changed from time to time according to changing situations and events, and the control system has to be designed to allow flexibility with maximum control. At present the fuel allocation procedures entailing fuel coupons and controlling their use is cumbersome and time consuming.

It is therefore the object of the present invention to provide a control system suitable to serve the combined functions of all the systems defined above and overcome the drawbacks of the present fuel allocation procedure for vehicle fleets.

The control system for vehicle fleets, herein provided, comprises:
an authorizer's electronic device for generation of an individual schedule for an individual driver;
and an individual user's key-order media for registration of said individual schedule received from said authorizer's electronic device;
an identification and data unit placed in the vehicle (VIDU), for recognizing said driver by means of said driver's individual key-order media; and storing said driver's individual schedule;

and a station control data storage and communication unit (DSCU), placed at a fuel station for identification of said vehicle and said driver; and checking said individual schedule before activating fuel pumps for fueling said vehicle, if authorized; and collecting the fuel consumption and schedule data; and transmitting said information to a central computer.

In the preferred embodiment said VIDU device is optionally provided with a sensors' unit for transmitting to said VIDU device a data concerning said vehicle's working parameters; and said station control data storage and communication unit (DSCU) is able to receive from said VIDU device, collect, check and transmit said data concerning said vehicle's working parameters to said central computer.

In the preferred embodiment said authorizer's electronic device comprises a slot for inserting thereinto said individual key-order media in order to transfer said individual schedule from said authorizer's electronic device to said individual key-order media.

In the preferred embodiment said authorizer's electronic device for generation of individual

schedule for an individual driver comprises a memory, a display, a key-board, a real-time clock and a communication port to said central computer.

In the preferred embodiment said authorizer's electronic device's memory is provided with a data base; and said data base comprises information concerning authorizers' identification and limitations, and also comprises a list of all schedules given to individual drivers by the same authorizer.

In the preferred embodiment said individual schedule list comprises information such as: individual user's identification; authorizer's code provided with a time definition and a digital signature; codes of the authorized vehicles for use; limitations of fuel consumption, distance and duration of travel, etc.

In the preferred embodiment said individual key-order media is a smart-card.

In the preferred embodiment said identification and data unit (VIDU) placed in the vehicle comprises an identification unit for receiving and recognition of said key-order individual media; a memory for holding a data base

and a control program; a sensors' unit for transmitting to said data base the appropriate information; a transmitters unit for transmitting the needed information to said station control data storage and communication unit (DSCU) for recognition and allowing to fuel said vehicle at the fuel station; and an executive unit for preventing said vehicle to be started when said user is not authorized to use said vehicle or his individual schedule is not followed, i.e. distance, time, fuel consumption etc.

In the preferred embodiment said data base of said VIDU memory holds information such as data concerning a plurality of authorizers and their digital signatures; a plurality of authorized drivers, readings of milage and fuel gauges; and optionally, such working parameters of said vehicle, as motor RPM, shock indication, break indication, engine on/off indication, etc.

In the preferred embodiment said station control data storage and communication unit (DSCU) is provided with a detection unit for receiving information from said VIDU; a memory holding a data base and a control program for identification of said vehicle and said driver, checking said individual schedules and, optionally, said data concerning said vehicle's

working parameters; an executive unit for generating control signals to said fuel pump; a communication means for transmitting the stored information concerning fuel consumption and schedule, and optionally, said recognized vehicle's working parameters, to said central computer and vise versa.

Brief description of the drawings

The invention can be best understood and illustrated by the aid of the following drawings.

Fig.1 illustrates the block-diagram of operation of the suggested control system for vehicle fleets.

Figs.2,3,4,5 illustrate several specific lists of data to be utilized in the control system's operation according to the block-diagram, shown in Fig.1.

Detailed description of the preferred embodiments.

Fig.1 illustrates the block diagram of the control system's functioning. The system's hardware comprises an authorizer's electronic device 11 at the disposal of an authorizer (an officer).
A specific schedule is dialed by the authorizer on a

keyboard of the device 11 (not shown) and is then transferred to a key-order media 12 by means of a control program and a specific hardware (not shown). The individual key-order media 12 intended to be handed over to a driver by the authorizer. The individual key-order media 12 should be firstly inserted by the authorizer into the authorizer's electronic device in order to transfer a specific schedule from the device 11 to the media 12. Later the driver can insert the media 12 into a vehicle's identification and data unit (VIDU) 13 which is installed in any specific vehicle. The VIDU unit 13 is designed to control, for example, the ignition lock 13A, which is capable to prevent the starting of the vehicle, if the driver is not recognized. The VIDU unit 13 is additionally connected to a unit 13B having several sensors for collecting the information concerning the working parameters of the vehicle. The system comprises also a station control data storage and communication unit (DSCU) 14, situated at a specific fuel station and intended to control the fueling of the specific vehicles by a fuel pump 15 and register and report the fuel consumption.

The station control data storage and communication unit DSCU 14 is connected to the VIDU unit 13 by transmit and receive loops (not shown) in order to transmit and receive the needed information from VIDU

13 and, optionally, to transfer orders from DSCU 14 to VIDU 13.

The system comprises also a communication line to a central computer 16 which is able to collect information from several DSCU units 14 of several corresponding fuel stations and is also capable to transmit back to any specific DSCU unit 14 any needed instructions by "off line" communication.

The central computer 16 may be optionally connected by communication lines to the authorizer's electronic device 11 in order to receive and register possible corrections in the schedules issued before by the identical authorizer; or, for example, in order to print out the delivered schedules for the authorizer, indicating time and date of the orders and vehicles' and drivers' specifications.

Figs.2-5 illustrates several specific lists of data to be utilized in the control system's operation according to the block-diagram, shown in Fig.1 in order to clarify the operation of the suggested control system for vehicle fleets.

Fig.2. For example, the authorizer's electronic device 11 should use the following data in its operation:

a list of possible authorizers' identification and limitations, a list of all schedules given to

individual drivers by the same authorizer.

Fig.3. The key-order media 12 bears the following information concerning a specific driver's schedule: individual user's identification; authorizer's code provided with a time definition and a digital signature; codes of the authorized vehicles for use; limitations of fuel consumption, distance and duration of travel, etc.

Fig.4. The VIDU unit 13 operates with the following stored information to be worked up by the control program:
the schedule which is received from the key-order media 12;
data concerning a plurality of possible authorizers and their digital signatures; a plurality of possible authorized drivers; readings of milage and fuel gauges. The control program stores and takes into account such working parameters of the vehicle, as motor RPM, shock indication, break indication, engine on/off indication, etc, obtained from the sensors. Based on this information's comparison and analysis the VIDU unit 13 is able to prevent the ignition 13A. The certain part of the stored information (i.e. identifications, limitations, gauges readings, vehicle parameters) is to be

transmitted to the DSCU unit 14 when fueling the vehicle; and some part of that information is then to be substituted in the VIDU 13 memory with the following portion of the current information.

Fig.5. The DSCU memory holds a data base and a control program for identification of the vehicle and the driver, and checking his individual schedule. The control program of DSCU 14 processes also the data concerning said vehicle's working parameters, ransferred from VIDU 13. Based on the above information an executive unit of DSCU 14 generates control signals to the fuel pump 15. Communication means are provided for transmitting the stored information concerning fuel consumption and schedule., and the recognized vehicle's working parameters, to the central computer 16 and vice versa.

While the present invention has been described with the aid of the attached drawings, it should be appreciated, that other additional elements may be suggested to the block-diagram, and additional data can be used by the described system; and such modifications should be considered as part of the present invention.

CLAIMS:

1. A control and monitoring system for vehicle fleets, comprising:

at least one authorizer's electronic device for generation of an individual schedule for an individual driver;

at least one individual driver's key-order media for registration of said individual schedule received from said authorizer's electronic device;

an identification and data unit (VIDU) placed in each one of the vehicles, for recognizing said driver by means of said driver's individual key-order media and storing said driver's individual schedule;

a data storage and communication unit (DSCU), placed at each fuel station providing service for said vehicle fleet; the DSCU unit being adapted to communicate with said VIDU unit for identification of said vehicle and said driver and checking said individual schedule before activating fuel pumps for fueling said vehicle, for collecting data on the fuel consumption and the individual schedule;

a central computer connected to each of said data storage and communication units (DSCU) for collecting therefrom data on said individual schedules and fuel consumption to be stored in the central computer and further checked.

2. A control and monitoring system for vehicle fleets according to Claim 1, wherein said authorizer's electronic device is adapted to be temporarily connected to said central computer for entering there into information on said individual schedule for an individual driver, for comparing said information with the data transmitted to the central computer from at least one DSCU units with respect to said driver's individual schedule.

3. A control and monitoring system according to Claim 2, wherein said central computer is adapted for transmittion to at least one of said data storage and communication units (DSCU) a signal initiated by a result of said comparison and intended for changing the driver's individual schedule stored in said at least one DSCU.

4. The control system for vehicle fleets, as in claim 1, wherein said VIDU device is optionally provided with a sensors' unit for transmitting to said VIDU device data concerning said vehicle's working parameters; and said station control data storage and communication unit (DSCU) is capable to receive from said VIDU device, and then store, check and transmit said data to said central computer.

5. The control system for vehicle fleets, as in claim 1, wherein said authorizer's electronic device comprises a slot for inserting thereinto said individual key-order media in order to transfer said individual schedule from said authorizer's electronic device to said individual key-order media.

6. The control system for vehicle fleets, as in claim 1, wherein said authorizer's electronic device for generation of individual schedule for an individual driver comprises a memory, a display, a key-board, a real-time clock and a communication port for communication with said central computer.

7. The control system for vehicle fleets, as in claim 6, wherein said authorizer's electronic device's memory is provided with a data base; and said data base comprises information concerning authorizers' identification and limitations, and also comprises a list of all schedules given to individual drivers by the same authorizer.

8. The control system for vehicle fleets, as in claim 1, wherein said individual schedule list comprises information such as:
individual user's identification; authorizer's code provided with a time definition and a digital signature; codes of the authorized vehicles for use; limitations of fuel consumption, distance and duration of travel, etc.

9. The control system for vehicle fleets, as in claim 1, wherein said individual key-order media is a smart-card.

10. The control system for vehicle fleets, as in claim 4, wherein said identification and data unit (VIDU) placed in the vehicle comprises an identification unit for receiving and recognition of said key-order individual media; a memory for holding a data base and a control program; a sensors' unit for transmitting to said data base the appropriate information; a transmitters unit for transmitting the needed information to said station control data storage and communication unit (DSCU) for recognition and allowing to fuel said vehicle at the fuel station; and an executive unit for preventing said vehicle to be started when said user is not authorized to use said vehicle or his individual schedule is not followed properly.

11. The control system for vehicle fleets, as in claim 10, wherein said data base of said VIDU memory holds information such as data concerning a plurality of authorizers and their digital signatures; a plurality of authorized drivers, readings of milage and fuel gauges; and such working parameters of said vehicle, as motor RPM, shock indication, break indication, engine on/off indication, etc.

12. The control system for vehicle fleets, as in claim 1, wherein said station control data storage and communication unit (DSCU) is provided with a detection unit for receiving information from said VIDU; a memory holding a data base and a control program for identification of said vehicle and said driver, checking said individual schedules and said data concerning said vehicle's working parameters; an executive unit for generating control signals to said fuel pump; a communication means for transmitting the stored information concerning fuel consumption and schedule, and optionally, said recognized vehicle's working parameters, to said central computer and vice versa.

For the Applicants,
DR. REINHOLD COHN AND PARTNERS
BY:

OKI-AK INDUSTRIES (1983) LTD

Fig. 1

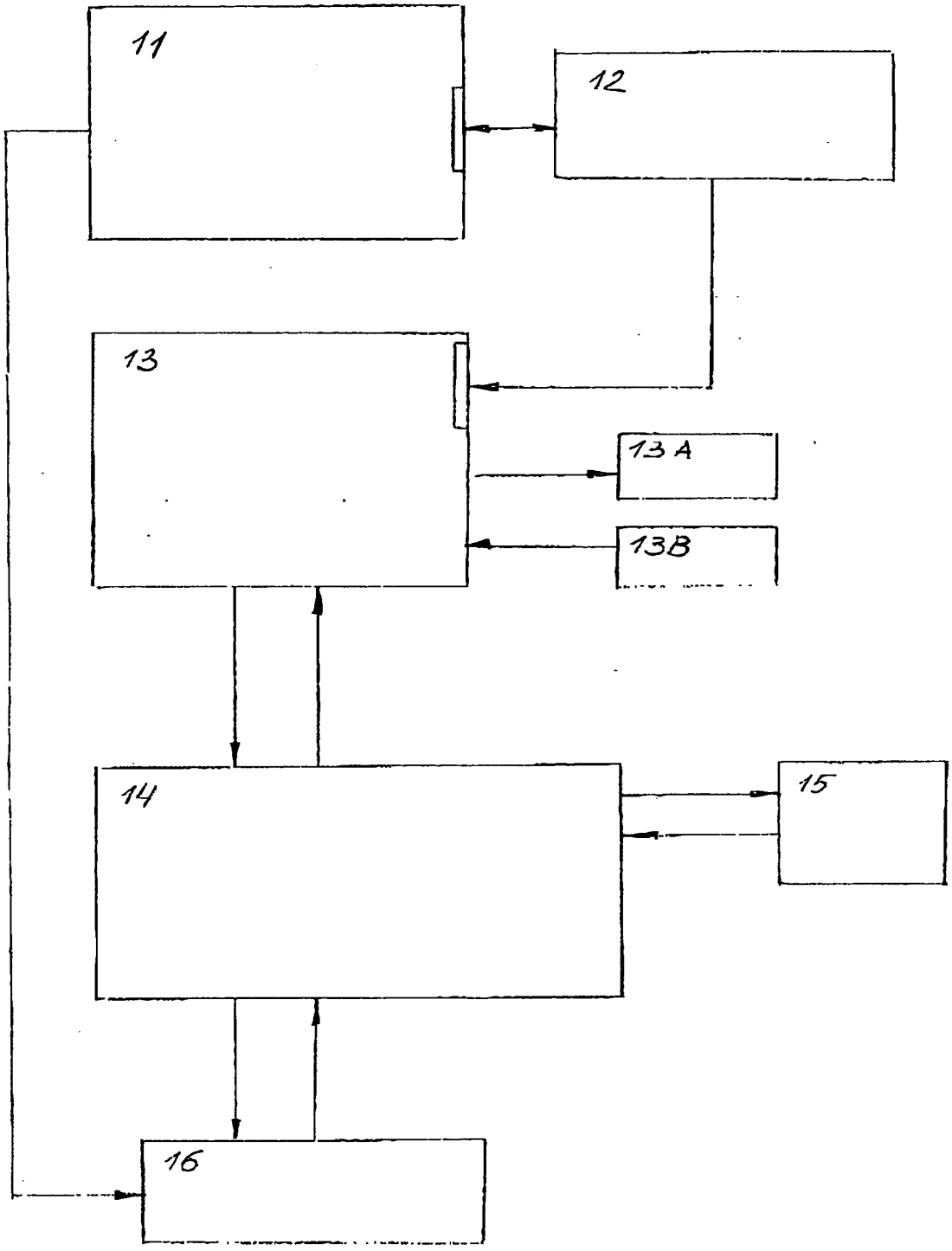


Fig. 2

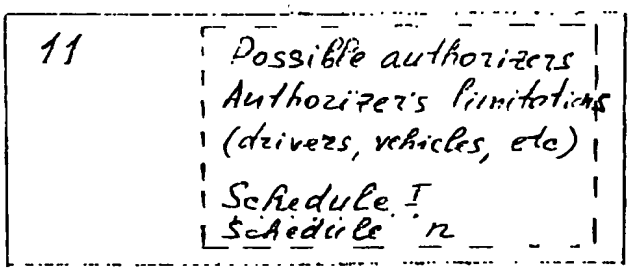

11
Possible authorizers
Authorizer's limitations
(drivers, vehicles, etc)
Schedule I
Schedule n

Fig. 3

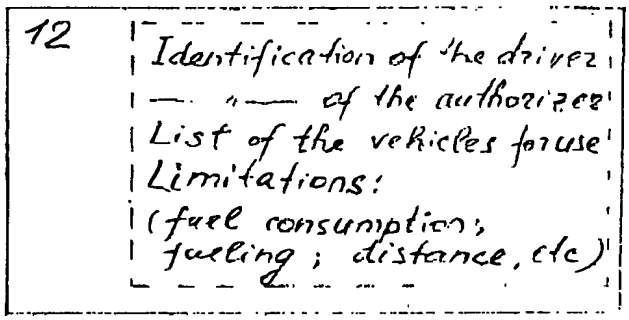

12
Identification of the driver
— " — of the authorizer
List of the vehicles for use
Limitations:
(fuel consumption;
fueling; distance, etc)

Fig. 4

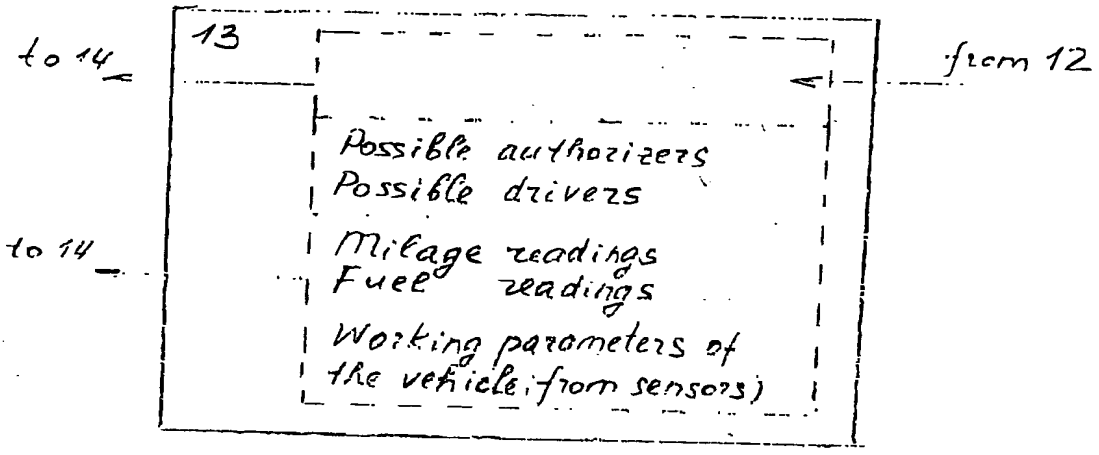
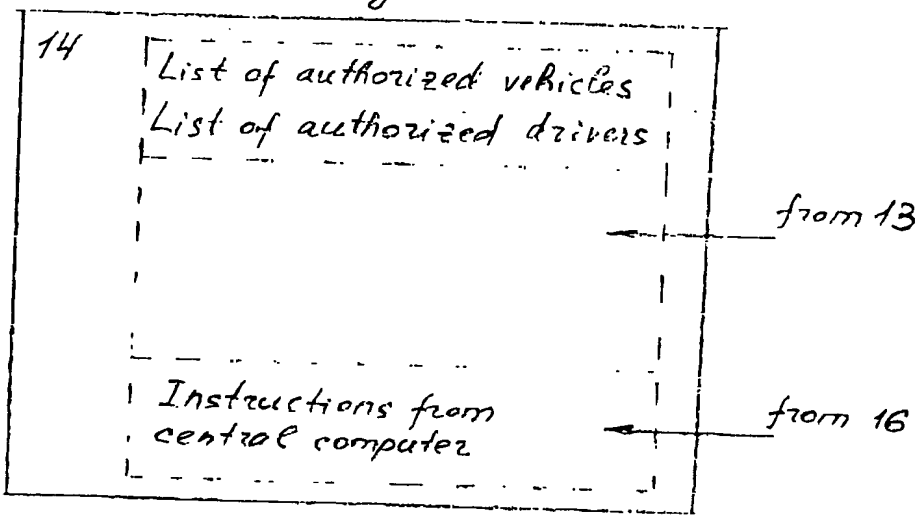

13
to 14
from 12
Possible authorizers
Possible drivers
to 14
Milage readings
Fuel readings
Working parameters of the vehicle (from sensors)

Fig. 5


14
List of authorized vehicles
List of authorized drivers
from 13
Instructions from central computer
from 16